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BASF Aktiengesellschaft

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We claim:

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1. A process for preparing arrays of heterogeneous catalysts and/or their precursors made up of a body which has, preferably parallel, through-channels and in which at least  $n$  channels comprise  $n$  different heterogeneous catalysts and/or their precursors, where  $n$  is 2, preferably 10, particularly preferably 100, comprising the following steps:

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a1) preparing solutions, emulsions and/or dispersions of elements and/or element compounds of the chemical elements present in the catalyst and/or catalyst precursor and, if appropriate preparing dispersions of inorganic support materials,

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a2) if appropriate introducing adhesion promoters, binders, viscosity regulators, pH regulators and/or solid inorganic supports into the solutions, emulsions and/or dispersions,

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a3) simultaneously or successively coating the channels of the body with the solutions, emulsions and/or dispersions, a predetermined amount of the solutions, emulsions and/or dispersions being introduced into each channel to obtain a predetermined composition,

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a4) treating and reacting with one or more reactive gases the freshly impregnated moist channels obtained after the coating, and

a5) if appropriate heating the coated body in the presence or absence of inert gases or reactive gases to a temperature in the range from 20 to 1500°C to dry, with or without sintering or calcining, the catalysts and/or catalyst precursors.

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2. A process for preparing arrays of heterogeneous catalysts and/or their precursors made up of a body which has, preferably parallel, through-channels and in which at least  $n$  channels comprise  $n$  different

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heterogeneous catalysts and/or their precursors, where n is 2, preferably 10, particularly preferably 100, comprising the following steps:

- 5           b1)   preparing solutions, emulsions and/or dispersions of elements and/or element compounds of the elements present in the catalyst and/or catalyst precursor and, if appropriate preparing dispersions of inorganic support materials,
- 10           b2)   if appropriate introducing adhesion promoters, binders, viscosity regulators, pH regulators and/or solid inorganic supports into the solutions, emulsions and/or dispersions,
- 15           b3)   simultaneously or successively coating catalyst supports present in the channels of the body with the solutions, emulsions and/or dispersions, a predetermined amount of the solutions, emulsions and/or dispersions being introduced into each channel to obtain a predetermined composition on the catalyst supports,
- 20           b4)   treating and reacting with one or more reactive gases the freshly impregnated moist channels obtained after the coating, and
- 25           b5)   if appropriate heating the body comprising the coated catalyst supports in the channels in the presence or absence of inert gases or reactive gases to a temperature in the range from 20 to 1500°C to dry, with or without sintering or calcining, the catalysts and/or catalyst precursors.
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- 35           c1)   preparing solutions, emulsions and/or dispersions of elements and/or element compounds of the chemical elements present in the catalyst and/or catalyst precursor and, if appropriate preparing dispersions of inorganic support materials,

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- c2) mixing predetermined amounts of the solutions, emulsions and/or dispersions with or without precipitation aids in one or more reaction vessels run in parallel,
- c3) if appropriate introducing adhesion promoters, binders, viscosity regulators, pH regulators and/or solid inorganic supports into the resultant mixture(s),
- 10 c4) coating one or more predetermined channels of the body with the mixture or a plurality of mixtures,
- c5) repeating steps c2) to c4) for other channels of the body until the channels containing the respective predetermined catalyst and/or catalyst precursor compositions are coated,
- 15 c6) treating and reacting with one or more reactive gases the freshly impregnated moist channels obtained after the coating, and
- 20 c7) if appropriate heating the coated body in the presence or absence of inert gases or reactive gases to a temperature in the range from 20 to 1500°C to dry, with or without sintering or calcining, the catalysts and/or catalyst precursors.
- 25 4. A process for preparing arrays of heterogeneous catalysts and/or their precursors made up of a body which has, preferably parallel, through-channels and in which at least n channels comprise n different heterogeneous catalysts and/or their precursors, where n is 2, preferably 10, particularly preferably 100, comprising the following steps:
- 30 d1) preparing solutions, emulsions and/or dispersions of elements and/or element compounds of the chemical elements present in the catalyst and/or catalyst precursor and, if appropriate preparing dispersions of inorganic support materials,
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- d2) mixing predetermined amounts of the solutions, emulsions and/or dispersions with or without precipitation aids in one or more reaction vessels run in parallel,
- 5 d3) if appropriate introducing adhesion promoters, binders, viscosity regulators, pH regulators and/or solid inorganic supports into the resultant mixture(s),
- 10 d4) coating catalyst supports present in one or more predetermined channels of the body with the mixture or one or more of the mixtures,
- 15 d5) repeating steps d2) to d4) for other channels of the body until the catalyst supports present in the channels of the body are coated with the respective predetermined catalyst compositions and/or catalyst precursor compositions,
- 20 d6) treating and reacting with one or more reactive gases the freshly impregnated moist channels obtained after the coating, and
- 25 d7) if appropriate heating the body comprising the coated catalyst supports in the channels in the presence or absence of inert gases or reactive gases to a temperature in the range from 20 to 1500°C to dry, with or without sintering or calcining, the catalysts and/or catalyst precursors.

5. A process for preparing arrays of heterogeneous catalysts and/or their precursors made up of a body which has, preferably parallel, through-channels and in which at least n channels comprise n different heterogeneous catalysts and/or their precursors, where n is 2, preferably 10, particularly preferably 100, comprising the following steps:

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- 35 e1) reacting predetermined dry porous catalyst supports with one or more reactive gases for preparing predetermined supported catalysts outside or inside the body,

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- e2) if appropriate introducing the supported catalysts prepared outside the body into predetermined channels of the body, and
- e3) if appropriate heating the filled body in the presence or absence of inert gases or reactive gases to a temperature in the range from 20 to 1500°C to dry, with or without sintering or calcining, the catalysts.
6. A process for preparing arrays of heterogeneous catalysts and/or their precursors made up of a body which has, preferably parallel, through-channels and in which at least n channels comprise n different heterogeneous catalysts and/or their precursors, where n is 2, preferably 10, particularly preferably 100, comprising the following steps:
- f1) coating and if appropriate heating predetermined catalyst supports to prepare predetermined supported catalysts in the manner defined in claim 2 outside the body,
- f2) introducing the supported catalysts into predetermined channels of the body,
- f3) if appropriate heating the packed body in the presence or absence of inert gases or reactive gases to a temperature in the range from 20 to 1500°C to dry, with or without sintering or calcining, the catalysts.
7. A process for preparing arrays of heterogeneous catalysts and/or their precursors made up of a body which has, preferably parallel, through-channels and in which at least n channels comprise n different heterogeneous catalysts and/or their precursors, where n is 2, preferably 10, particularly preferably 100, comprising the following steps:
- g1) simultaneous or sequential coating of the channels of the body with gasified chemical elements or their mixtures of the chemical elements present in the catalyst, and
- g2) if appropriate heating the coated body in the presence or absence of inert gases or reactive gases to a temperature in the range of from 20

to 1 500°C to dry, with or without sintering or calcining, the catalysts and/or catalyst precursors.

8. A process for preparing arrays of heterogeneous catalysts and/or their  
5 precursors made up of a body which has, preferably parallel, through-  
channels and in which at least n channels comprise n different  
heterogeneous catalysts and/or their precursors, where n is 2, preferably 10,  
particularly preferably 100, comprising the following steps:
- 10 h1) simultaneous or sequential coating of the channels of the body with  
pulverulent chemical elements or their mixtures of the chemical  
elements present in the catalyst, and
- h2) if appropriate heating the coated body in the presence or absence of  
15 inert gases or reactive gases to a temperature in the range of from 20  
to 1 500°C to dry, and if appropriate sinter or calcine, the catalysts  
and/or catalyst precursors.
9. An array obtainable by a process as claimed in claim 1.
- 20 10. A process for determining the activity, selectivity and/or long-term stability  
of the catalysts in an array as claimed in claim 9, comprising the following  
steps:
- 25 i1) if appropriate activating the catalysts in the body,
- i2) heating or cooling the body to a desired reaction temperature,
- i3) passing a fluid reactant or a fluid reaction mixture through channels of  
30 the body,
- i4) discharge of the reacted fluids from individual or a plurality of  
collective channels of the body,
- 35 i5) analysis of the discharged reacted fluids,

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- i6) if appropriate comparative evaluation of the analytical results of a plurality of analyses.